

Amendments to the Claims

Please amend Claims 1, 14 and 21 and please add Claims 30-34 as follows.

1. (Currently amended) A recording apparatus for recording an image on a recording medium by using a recording head in which a plurality of recording elements are arranged and for correcting non-uniformities in the density of the recorded image caused by different recording elements having different recording characteristics, said apparatus comprising:

memory means for storing a first table group for correcting input multi-level image data, the first table group comprising a plurality of first correction tables, each first correction table having a different degree of correction, and a second table group comprising a plurality of second correction tables having correction characteristics which are different from correction characteristics of the first table group with respect to different density levels;

first forming means for instructing each of the recording elements to record a pixel of a predetermined density to form ~~forming~~ a first test pattern using all of ~~by the plurality of~~ recording elements ~~at a predetermined density~~;

first setting means for setting test correction tables for making the densities of an image to be recorded by the plurality of recording elements uniform by associating first correction tables of the first table group with respective recording elements of the plurality of recording elements based on a result of reading the densities of areas of the first test pattern that correspond to the plurality of recording elements;

second forming means for instructing each of the plurality of recording elements to record a plurality of pixels at the same plurality of different density levels, to form ~~forming~~ a second test pattern having a plurality of different density levels, the second test pattern being recorded with

the recording elements being corrected by the test correction tables set by said first setting means;
and

second setting means for setting recording correction tables corresponding to each of the plurality of recording elements based on the second test pattern, the recording correction tables being selected from among the first table group and the second table group.

2. (Original) An apparatus according to Claim 1, further comprising selection means for selecting the recording correction tables by a user judging the second test pattern.

3. (Original) An apparatus according to Claim 1, wherein the second table group comprising the plurality of second correction tables comprises a first table for higher density levels and a second table for lower density levels, the second table having a degree of correction different from a degree of correction of the first table.

4. (Original) An apparatus according to Claim 1, wherein the recording elements comprise light emitting elements.

5. (Original) An apparatus according to Claim 4, wherein the light emitting elements comprise LED elements.

6. (Original) An apparatus according to Claim 1, wherein the recording head is an ink jet head for recording by ejecting ink from a plurality of nozzles in response to driving of the recording elements.

7. (Original) An apparatus according to Claim 6, wherein the recording elements comprise electrothermal converters for applying thermal energy to ink.

8. (Original) An apparatus according to Claim 6, wherein the recording elements comprise piezoelectric converters for ejecting the ink.

9. (Original) An apparatus according to Claim 1, further comprising reading means for reading recorded images.

10. (Original) An apparatus according to Claim 9, wherein said first setting means sets the test correction tables based on a result of reading the first test pattern by said reading means.

11. (Original) An apparatus according to Claim 1, further comprising third forming means for forming a third test pattern having the plurality of different density levels, the third test pattern being recorded by recording elements uncorrected by any correction table, wherein said second setting means sets the recording correction tables based on a comparison of the second test pattern and the third test pattern.

12. (Original) An apparatus according to Claim 11, wherein the comparison of the second and third test patterns is performed by a user.

13. (Original) An apparatus according to Claim 11, further comprising reading means for reading recorded images and comparing means for comparing densities of read images, wherein said reading means reads the second and third test patterns and the comparison of the second and third test patterns is performed by said comparing means comparing data read by said reading means.

14. (Currently amended) A method for correcting ~~nonuniformities~~ non-uniformities in the density of an image recorded by a recording head having a plurality of recording elements arranged therein caused by different recording elements having different recording characteristics, said method comprising the steps of:

forming a first test pattern by instructing each of the recording elements to record a pixel of a predetermined density ~~the plurality of recording elements at a predetermined density~~;

setting, in a first setting step, test correction tables for making the densities of an image to be recorded by the plurality of recording elements uniform by associating first correction tables, which are from among a first table group for correcting input multi-level image data, with respective recording elements of the plurality of recording elements based on a result of reading densities of areas of the first test pattern that correspond to the plurality of recording elements;

forming a second test pattern having a plurality of different density levels by instructing each of the plurality of recording elements to record a plurality of pixels at the same plurality of

different density levels, the second test pattern being recorded with the recording elements being corrected by the test correction tables set in said first setting step; and

setting, in a second setting step, recording correction tables corresponding to each of the plurality of recording elements based on the second test pattern, the recording correction tables being selected from among the first table group and a second table group comprising second correction tables having correction characteristics which are different from correction characteristics of corresponding first correction tables of the first table group with respect to different density levels.

15. (Original) A method according to Claim 14, further comprising a step of selecting the recording correction tables by a user judging the second test pattern.

16. (Original) A method according to Claim 14, wherein the second table group comprising the plurality of second correction tables comprises a first table for higher density levels and a second table for lower density levels, the second table having a degree of correction different from a degree of correction of the first table.

17. (Original) A method according to Claim 14, further comprising a step of reading recorded images, wherein said first setting step sets the test correction tables based on a result of reading the first test pattern in said reading step.

18. (Original) A method according to Claim 14, further comprising a third forming step of forming a third test pattern having the plurality of different density levels, the third test pattern being recorded by recording elements uncorrected by any correction table, wherein said second setting step sets the recording correction tables based on a comparison of the second test pattern and the third test pattern.

19. (Original) A method according to Claim 18, wherein the comparison of the second and third test patterns is performed by a user.

20. (Original) A method according to Claim 18, further comprising a step of reading recorded images and a step of comparing densities of read images, wherein said reading step reads the second and third test patterns and the comparison of the second and third test patterns is performed by said comparing step comparing data read in said reading step.

21. (Currently amended) A recording apparatus for performing binary recording on a recording medium by controlling binarizing means for binarizing input multi-level data and driving recording heads, each recording head comprising a plurality of recording elements, according to a binary signal output by the binarizing means, and for correcting non-uniformities in the density of a recorded image caused by different recording elements having different recording characteristics, said apparatus comprising:

a plurality of density correcting table groups for correcting input multi-level image data, the density correcting table groups each comprising a plurality of correcting tables, each having a

different correction amount and having different correction characteristics from each other, wherein corresponding tables from each table group differ in correction amount at a particular density level range;

means for determining whether different recording elements have different recording characteristics by determining whether all of the recording elements record pixels of a predetermined density level in response to being instructed by the multi-level data to record at the predetermined density level;

means for selecting, for any recording element determined by said determining means not to print a pixel at the predetermined density, one a density correcting table group from the plurality of density correcting table groups having a correcting table correcting the density of pixels to be recorded by that recording element; and

correcting means for correcting the operation of any recording element determined by said determining means not to print a pixel at the predetermined density multi-level data by associating the multi-level data address of that recording element with a the correcting table from the selected correcting table group that will correct the density of pixels recorded by that recording element according to a pixel address of a corresponding recording head for each pixel.

22. (Original) An apparatus according to Claim 21, wherein in said means for selecting the one density correcting table group from the plurality of density correcting table groups, selection input is performed by a user.

23. (Original) An apparatus according to Claim 21, wherein one correcting table group of the plurality of correcting table groups comprises correcting tables having correction characteristics which differ from correction characteristics of correcting tables of another correcting table group at different density levels.

24. (Original) An apparatus according to Claim 21, further comprising means for generating the multi-level data by reading a document.

25. (Original) An apparatus according to Claim 21, wherein the recording elements comprise light emitting elements.

26. (Original) An apparatus according to Claim 25, wherein the light emitting elements comprise LED elements.

27. (Original) An apparatus according to Claim 21, wherein the recording head is an ink jet head for recording by ejecting ink from a plurality of nozzles in response to driving of the recording elements.

28. (Original) An apparatus according to Claim 27, wherein the recording elements comprise electrothermal converters for applying thermal energy to ink.

29. (Previously presented) An apparatus according to Claim 27, wherein the recording elements comprise piezoelectric converters for ejecting the ink.

30. (New) A recording apparatus according to Claim 1, wherein said first setting means comprises:

means for reading the density of each recorded pixel produced by each recording element;

means for determining whether the read density of each recorded pixel is the same as the predetermined density; and

means for correcting the operation of each recording element that recorded a pixel of different density than the predetermined density by associating a particular first correction table of the first table group with each recording element that recorded a pixel of a different density than the predetermined density,

the particular first correction table associated with each recording element providing a compensating correction to each recording element that recorded a pixel of a different density than the predetermined density,

wherein correction tables associated with recording elements recording pixels of different densities by the first forming means provide differing compensating corrections.

31. (New) A recording apparatus according to Claim 30, wherein said second setting means comprises:

means for reading the density of each recorded pixel produced by each recording element as a result of being instructed to record by said second forming means;

means for determining whether the recorded pixels exhibit a non-uniform density within each density level; and

means for correcting the operation of each recording element at a particular instructed density level that contributes to any determined density non-uniformity by associating a particular first correction table of the first table group or a particular second correction table of the second table group with each recording element that contributes to any determined density non-uniformity.

32. (New) A method according to Claim 14, wherein said first setting step comprises the steps of:

reading the density of each recorded pixel produced by each recording element;
determining whether the read density of each recorded pixel is the same as the predetermined density; and

correcting the operation of each recording element that recorded a pixel of different density than the predetermined density by associating a particular first correction table of the first table group with each recording element that recorded a pixel of a different density than the predetermined density,

the particular first correction table associated with each recording element providing a compensating correction to each recording element that recorded a pixel of a different density than the predetermined density,

wherein correction tables associated with recording elements recording pixels of different densities by the first forming means provide differing compensating corrections.

33. (New) A method according to Claim 32, wherein said second setting step comprises the steps of:

reading the density of each recorded pixel produced by each recording element instructed by said second forming step;

determining whether each of the read pixels recorded as a result of instructions provided in said second forming step produce a non-uniform density within each density level; and

correcting the operation of each recording element at a particular instructed density level that produces a density non-uniformity by associating a particular first correction table of the first table group or a particular second correction table of the second table group with each recording element that contributes to any determined density non-uniformity.

34. (New) A recording apparatus according to Claim 21,

wherein said determining means comprises:

means for reading the density of each recorded pixel produced by each recording element; and

means for determining whether the read density of each recorded pixel is the same as the predetermined density level.